eBee
senseFly

The drone for **precision agriculture**

Reap the benefits of scouting crops from above

If precision technology has driven the farming revolution of recent years, monitoring crops from the sky will drive the next.

With a drone or UAV you can capture highly accurate images of your fields, covering hundreds of hectares/acres in a single flight. Without the cost and hassle of manned services. And at a greater resolution than satellite imagery typically provides.

By using image processing software you can then transform these shots into one large 'orthomosaic' image. Apply algorithms like Normalized Difference Vegetation Index (NDVI) to this and you create a reflectance map of your crop.

This map is the key to boosting yields, cutting costs, and driving your business forwards. It highlights exactly which areas of crop need closer examination – for less time spent scouting, and more time treating the plants that need it.

4 reasons to choose the eBee Ag

01. Versatile

With its four different camera options the eBee Ag suits numerous agricultural applications. Use the NIR camera supplied or add one of our red-edge, RGB or multispectral sensors.

02. Reliable

The eBee Ag's artificial intelligence and robust lightweight construction ensure it will survive numerous flights (and landings), thus safeguarding your investment.

03. Easy to use

The eBee Ag is a fully automonous drone. Just select the area you want to map using our eMotion software, throw your drone into the air, and the eBee Ag will fly, acquire images and land itself.

04. Complete solution

The eBee Ag is supplied with a sturdy carry case and two advanced software packages: eMotion 2 for flight planning and monitoring; and Postflight Terra 3D for post-flight image processing and analysis.

Wide camera choice
• 4 sensor options: NIR, red-edge, RGB, multispectral

Electric
• Brushless electric motor
• Low noise
• Environmentally friendly

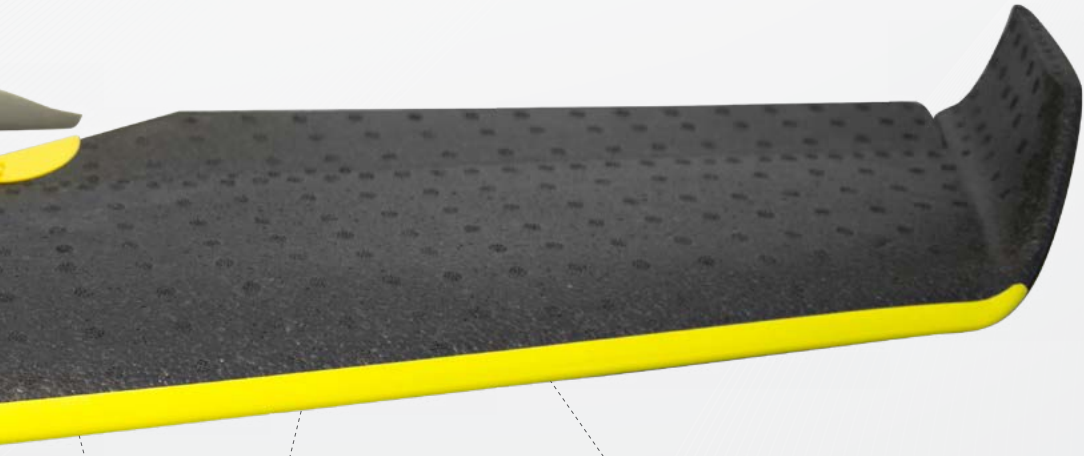
Ground sensor
• Highly accurate
• Allows eBee Ag to land softly & more precisely than GPS alone

Onboard artificial intelligence
• Analyses data from Inertial Measurement Unit & onboard GPS
• Optimises all aspects of every flight

Onboard eBee Ag

The eBee Ag is an artificially intelligent, fully autonomous drone. It is designed with safety in mind and contains numerous built-in fail-safe systems.

Thanks to its modular design, its wings can be easily disassembled and stored with its central body in a convenient carry-on sized case (supplied).



Reliable
- Onboard artificial intelligence
- Robust lightweight construction
- Able to survive numerous flights

Fully automated
- Create your flight plan
- Throw eBee Ag into the air
- Flies, acquires images & lands itself

Super lightweight
- Durable EPP foam body & wings
- Take-off weight: 0.71 kg (1.56 lbs)

Plan & control your flight

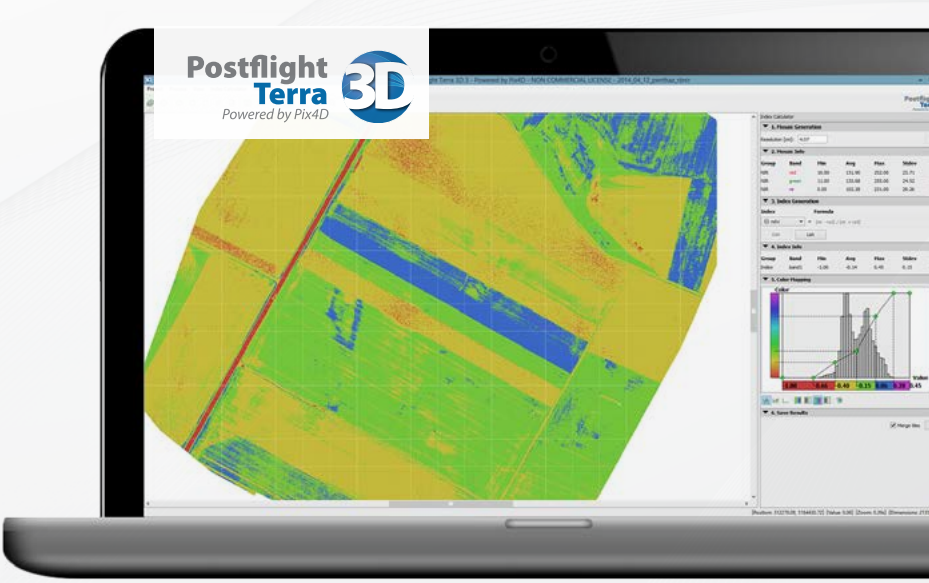
senseFly's intuitive eMotion software makes it easy to plan and simulate your scouting mission.

Plan: Import your base map of choice and define the area you want to assess. Then specify your required ground resolution, with a GSD of down to 2 cm per pixel, and image overlap.

eMotion automatically generates a full flight plan, calculating the eBee Ag's required altitude and displaying its projected trajectory.

Flying over uneven terrain? Use eMotion's 3D mission planning feature to take into account elevation data when setting the altitude of mission waypoints and the resulting flight lines - improving ground resolution and increasing mission safety.

Simulate: To ensure your mission's success, run a virtual flight that simulates wind strength and direction. Then make any flight plan updates required and prepare to launch.



Create maps to assess crop health

Process: Once the eBee Ag has landed, use its supplied Postflight Terra 3D software to process your flight's photos.

In just a few clicks you can transform this imagery into geo-referenced 2D orthomosaics and 3D digital elevation models.

Analyse: Postflight Terra 3D includes a handy index computation tab - just select a band from your near infrared or multispectral camera and calculate NDVI to assess plant health.

You can also input custom formulas and customise colours to create exactly the map you require.

S110 NIR

Supplied

Like all eBee Ag cameras, this customised 12 MP model has been adapted so that it can be controlled by the drone's autopilot. It acquires image data in the near infrared (NIR) band, the region where high plant reflectance occurs. Its exposure parameters can be set manually and its RAW files are fully supported by the eBee Ag's software.

Example applications: biomass indication, growth monitoring, crop discrimination, leaf area indexing.

S110 RE

Unlike the NIR camera above, the 12 MB S110 RE acquires data in the red edge band, the region where a plant's reflectance changes from low to high. The S110 RE's exposure parameters can also be set manually and its RAW files are fully supported by the eBee Ag's software.

Example applications: plant stress assessment, chlorophyll indication, senescence analysis, drought assessment.

S110 RGB

The 12 MB S110 RGB acquires regular image data in the visible spectrum. Like the cameras above, its exposure parameters can be set manually and its RAW files are fully supported by the eBee Ag's software.

Example applications: real colour 2D and 3D visual rendering, chlorophyll indication, drainage evaluation.

Choose your accessory

multiSPEC 4C AIRINOV

The multiSPEC 4C is a cutting-edge sensor unit developed by Airinov's agronomy specialists and customised for the eBee Ag. It contains four separate 1.2 megapixel sensors that are controlled by the eBee Ag's autopilot. These acquire data across four highly precise bands, plus each sensor features a global shutter for sharp, undistorted images.

Example applications: biomass indication, leaf area indexing, nitrogen recommendation, phenology and many more.

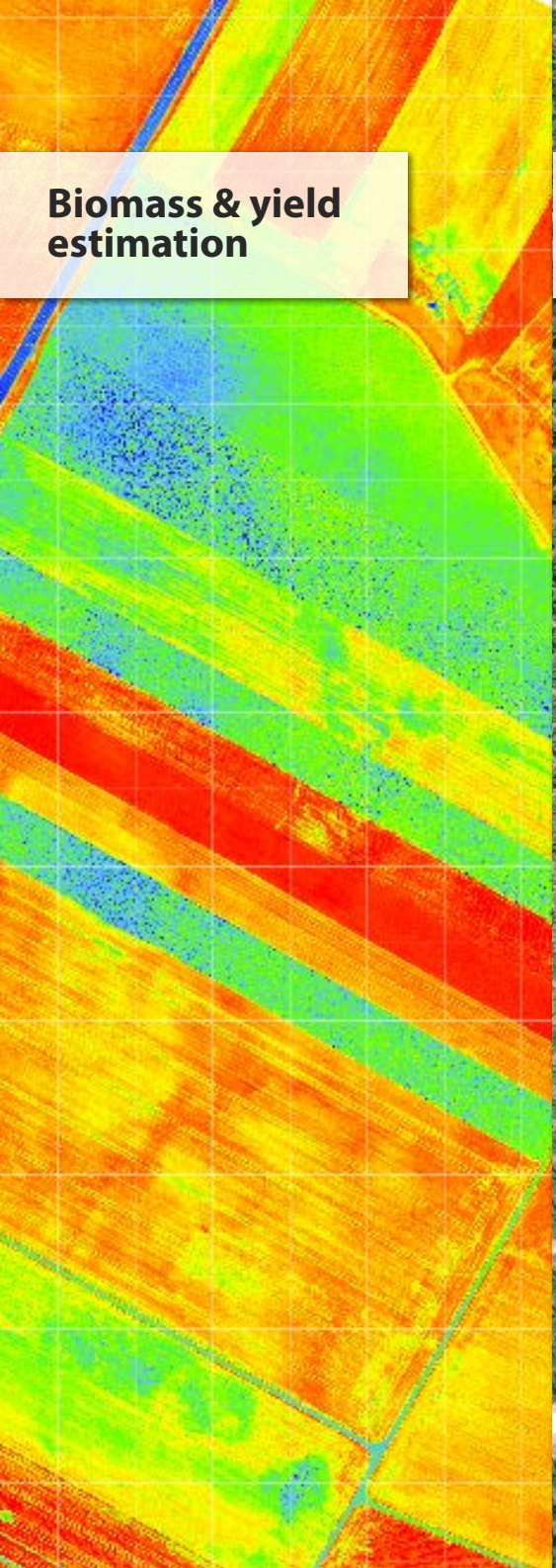
thermoMAP

With thermoMAP you can literally take your crop's temperature, capturing thermal video and/or still images to create full thermal maps of your fields.

Applications: water distribution management, irrigation checking, alternative method of plant stress analysis.

Radio tracker

If your region is prone to sudden gusty winds, or you plan to fly out of line of sight, this accessory can serve as a useful extra safeguard against unexpected aircraft loss. It comprises a small transmitter that fits snugly next to the eBee Ag's battery bay, plus a portable handheld receiver.


Biomass & yield estimation

Plant counting

Plus…

Stress assessment

Senescence analysis

Leaf area indexing

Phenology

Growth monitoring

Crop discrimination

Weed detection

Tree classification

Drainage planning

… and much more.

Technical specifications

Hardware

Weight (inc. supplied camera)	Approx. 0.71 kg (1.56 lbs)
Wingspan	96 cm (38 in)
Material	EPP foam, carbon structure & composite parts
Propulsion	Electric pusher propeller, 160 W brushless DC motor
Battery	11.1 V, 2150 mAh
Camera (supplied)	12 MP S110 NIR
Cameras (optional)	S110 RE, S110 RGB, multiSPEC 4C, thermoMAP
Carry case dimensions	55 x 45 x 25 cm (21.6 x 17.7 x 9.8 in)

Operation

Maximum flight time	45 minutes
Nominal cruise speed	40-90 km/h (11-25 m/s or 25-56 mph)
Radio link range	Up to 3 km (1.86 miles)
Maximum coverage (single flight)	1,000 ha / 2,470 ac (at 974 m / 3,195 ft altitude AGL)
Wind resistance	Up to 45 km/h (12m/s or 28 mph)
Ground Sampling Distance (GSD)	Down to 2 cm (0.79 in) per pixel
Relative orthomosaic/3D model accuracy	1-3x GSD
Absolute horizontal/vertical accuracy (w/GCPs)	Down to 4 cm (1.5 in) / 7 cm (2.75 in)
Absolute horizontal/vertical accuracy (no GCPs)	1-5 m (3.3-16.4 ft)
Multi-drone operation	Yes (inc. mid-air collision avoidance)
Automatic 3D flight planning	Yes
Linear landing accuracy	Approx. 5 m (16.4 ft)

Package contents

- eBee Ag body (inc. all electronics & built-in autopilot)
- Pair of detachable wings
- 12 MP S110 NIR still camera (inc. 16 GB SD card, battery, USB cable & charger)
- 2.4 GHz USB radio modem for data link (inc. USB cable)
- Two Lithium-Polymer battery packs & charger
- Spare propeller
- Carry case with foam protection
- Remote control & accessories (for safety pilots)
- User manual
- Software included: eMotion (flight planning & control) & Postflight Terra 3D (image processing & index calculation)

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About senseFly: senseFly designs, assembles and markets autonomous mini-drones and related software solutions for civil professional applications such as precision agriculture, land surveying, GIS, construction, environmental conservation and more.

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